A WINTER ROBIN ROOST IN ARKANSAS

BY J. D. BLACK

During the three recent winters (1926-27, 1927-28, and 1928-29) there have been roosts of varying size including the common and southern varieties of the Robin (*Turdus migratorius migratorius* and *T. m. achrusterus*) situated in and around Winslow, and during the past winter the writer had the opportunity to study their habits closely, the 1928 roost being only about a mile north of his home and containing at one time over 250,000 individuals.

Winslow, known throughout the south as "The Top of the Ozarks", has an elevation of 1734 feet at a central point in the village, and the surrounding territory, or rather most of it, is considerably higher, some places being as high as 2500 feet above sea level. The immediate vicinity of Winslow is covered with deciduous growth, the various oaks, hickories, maples, etc., being the most common trees. It has been, and still is, a considerable lumber center, with great numbers of trees being cut, leaving a heavy growth of underbrush over a large proportion of the land. The 1928 roost, being occupied from October 22 to December 16, 1928, was situated on a hill, or hills, at the head of a small ravine, facing east, although some of the birds roosted in the ravine itself, at an elevation of about 1800 feet.

The roost, when at its height, covered about a mile square, the birds never concentrating as they did in 1926, although being sufficiently thick to give the impression of immense numbers—concerning which we will deal later. The tract of land occupied has been closely cut over, leaving only occasional trees standing among the dense undergrowth, but the slopes of the ravine are well covered with small trees—nearly all second growth timber.

The first Robins arrived on October 22, and these were augmented by a few others before the first check as to the number present was made on the evening of the 24th, when an estimated number of 4,000 went into the roost. By the 28th there were at least 25,000 birds present, for six observers, covering less than half the territory surrounding the roost, reported 16,948 birds flying into the roosting grounds on that date.

The last actual check of the birds flying into the roost was made on November 7, when six observers, all well trained, covering only the south, southeast, east, and southwest, with the west half of the south section, the west, northwest, north, and northeast not being watched, listed over 74,000 birds going in. The estimates were carefully computed and the lowest figure adopted in all cases. The writer was in

the roost at the time of the flight and knows that more birds arrived from the north, northeast, and northwest, than from other directions, and believes that an estimate of 150,000 birds at that date is extremely low. The figure probably would have exceeded 200,000. Many more birds arrived after November 7 and at the time of their departure, on December 16, there were at least 250,000 birds roosting on this tract.

Due credit should be given here for the assistance of Robert Adkins, Paul Vandiver, Allen Land, and my brother, Olan H. Black, for their valuable assistance in helping check the flight of the birds, and to Paul Vandiver, Omer A. Winn, and Leonard Wallace (the last named accidentally shot and killed himself November 18, while hunting bobcats within the boundaries of the roost) for their generous assistance in the banding work carried on at night.

A study of the time of arrival of the birds at the roost, in relation to the direction from which they came, together with their speed of flight, and the time required for all the birds to pass over, leads to several interesting conjectures as to the distance covered in their search for food.

The check of October 28, being the most detailed from this standpoint, and covering the widest range of observation points, will be used to bring out these facts, the larger flights on later dates differing only in the number of individuals involved.

On this date my brother and Paul Vandiver worked together on the southeast, Robert Adkins handled the southwest, and I the east, while others were posted along the west, but it is regrettable that these observers (on the west) left their posts too soon for their work to be of any value on this point, and their reports have been eliminated.

From the southeast the first bird arrived at 4:25, and the flight proper commenced at 4:32, continuing almost steadily until 5:22, with the majority of the birds passing between 4:46 and 5:10. Seven thousand, eight hundred and ninety-two birds were listed from that direction, 3,000 from 4:56 to 5:00 P. M.

From the east I recorded the first bird at 3:45, five stragglers going in at that time, and five more at 3:49, while the flight proper commenced at 4:31, with a flock of 100, and continued until 5:10. The main body passed from 4:40 until 5:05, with 2,400 going over during the five-minute period from 4:45 to 4:50. The observations of Robert Adkins on the southwest coincided closely with those of myself, and were, on the average, ten minutes earlier throughout than the southeast reports.

The birds flew at an average speed of twenty-five miles per hour, being timed in various manners, on several different dates, the early arrivals sometimes flying as slowly as twenty miles per hour, and the late ones as fast as thirty.[1] On cloudy, dark days the birds would fly somewhat faster than on clear days, and would come in about fifteen minutes earlier. On clear days they usually made considerable commotion flying over, while on cloudy days they scarcely made a sound, flying as though the most important object in their lives was to get into the roost and comfortably settled before darkness overtook them.

The birds that came in from the southeast, and which arrived on the average ten minutes later than the others, all passed directly over Winslow and a strip of land from two to three miles wide that was barren, or nearly so, of the food they demanded. This distance possibly explains the difference in the time of arrival, but does not exactly coincide with the ten minute variation in the time. It is evident that they ranged slightly farther than the others.

Assuming that the Robins all left their feeding grounds at the same time, and traveled at the speed of fifteen miles per hour, occasional stops included, (flight speed of 25 miles per hour, allowance thus being made for rests, whether they were taken or not cannot be determined definitely, but it is supposed they did), and assuming that the first arrivals fed nearby, the conclusion would be reached that at least part of the birds fed at a distance of twelve and a half miles from the roost—the speed of flight being fifteen miles per hour and the period of flight covering fifty minutes over the southeastern sector. These are, of course only approximate figures, but have been pretty well substantiated by reports from points ten to fifteen miles away of flocks of Robins flying toward Winslow in the evening and appearing again from that direction in the morning. Some of the birds that appeared from the east during the first fifteen minutes of the actual flights often were seen coming from the trees of the first mountain east of the point of observation, while the late arrivals always were flying high and straight, as though from a great distance.

The birds lived, for the most part, on the berries of the Black Gum (*Myassa sylvatica*) during their stay here, although they con-

[1]Two methods of calculating the speed of flight were used. The first method required two observers, with synchronized watches, located at different points. A given bird was timed by each observer as it passed his station, and the records were later compared. The second method was operated by a single observer who timed a flying bird as it passed two points a known distance apart. The first method was discarded as unsatisfactory, and figures derived by the second method are used in this paper.

sumed vast quantities of the small Fox Grape, as well as various other berries that were available at that time of the year.

The Black Gum produced enormous quantities of berries last season and thus furnished food for these birds for a considerable period of time, the only logical explanation for their long stay here, and the reason for their leaving as well; for after the 18th of December hardly a berry was left on any of the gum trees I saw, and the same condition was reported by others for several miles around Winslow. The birds were observed to go into the roost in the same vast numbers on the evening of December 16, but not so much as a single bird was again seen until February 18, when they re-appeared in small numbers for the breeding season.

Most interesting to me of all was the behavior of the brids in the roost in the evening as they came in, and I spent several evenings in this study, making photographs of the birds while in the roost. Two typical days were the 30th of October and November 7.

To quote from my notes of October 30: "Robins were everywhere, and thousands more coming in all the time. Robins flying from the north, east, south, and west in continual streams, there being Robins coming to rest in trees nearby, others flying over hunting for suitable resting places, and still more Robins coming into sight on the horizon."

"They were in a singing mood and sometimes as many as five or six hundred would be singing at the same time! There was also a continual chattering and chirping as the birds settled down, this being underway when I arrived and still going on when I left."

Again on November 7, when there were many more birds present: "While the boys were checking the flight this evening, I was again on the hill where the Robins were settling and it was marvelous to watch, with many, many birds coming in. I arrived on the hill about 4:30 and left an hour later, and aside from the continual chirping and chattering the birds made another sound—like that of rain falling on dried leaves—caused by the birds' wings brushing the leaves as they went in and out of the bushes. This sound was continuous and very noticcable. They were singing very little this evening and never did I notice more than ten or twelve birds singing at the same time."

On an occasion or two I firmly believe that I heard as many as a thousand of these birds singing at the same time, the song accompanied by the rushing sound of wings: and the din of their incessant chattering as they settled down was a sound that made a deep and lasting impression on my mind—one that I will be able to recall vividly many

years from now. The birds that were singing would invariably seek the upper limbs of the large leafless trees, and sometimes I have seen forty or fifty birds singing in a single tree. You who have thrilled at the song of a single Robin in the springtime, can, possibly, imagine the effect of a thousand of these gifted vocalists in full song during the bleak days of early winter.

There was almost every conceivable plumage and type of Robin in the roost. Many semi-melanistic birds were there, very dark specimens, one being observed that possessed glossy black under tail coverts, while the others (of the dark type bird) usually had a blackish effect on the back and the rufous of the breast was considerably darker than the typical variety which breeds here. There was a third type—besides the common and the dark plumaged birds—which I have never been able to convince myself was referable to either *migratorius* or *achrusterus*, and certainly not the western variety (*propinquus*). They were considerably larger than the ordinary Robin and very pale, the feathers being distinctly edged with whitish, the rufous of the breast in some cases being exceptionally faint, and the white spots on the tail very large. All three types of birds roosted separately and were decidedly different in their behavior when captured. We knew the birds as Types One, Two, and Three, in the order described, (Type One, the blackish birds; Type Two, the typical *migratorius* and *achrusterus;* and Type Three, the large, pale birds), and found this a convenient way of referring to them.

With the assistance of the helpers previously mentioned I caught and banded an even hundred birds, all of which were reported as *migratorius*, because of the fact that there were so many hybrids and phases of plumage present that it was impossible to classify the birds properly, particularly at night, as to the subspecies. Type One never made a sound when captured and these birds were the delight of the entire banding crew. They seemed to roost in more open localities than either of the other two types, while the large whitish birds, the Type Three, were exceedingly difficult to capture, being very wary, always the first to take wing, always screaming loudly when netted, and roosting in the most inaccessible portions of the cover.

The birds banded were captured, in most instances, with a large, specially constructed net, much on the order of a butterfly net, only many times stronger, and somewhat larger. Some birds were caught by hand, and a few in a very small net, which was particularly useful in the very dense underbrush, where it was impossible to take the larger net, much less attempt to use it.

Dry, moonlight nights were excellent times to observe the restless traits of these birds, but it was impossible to even approach them on such occasions, they taking alarm a full hundred yards ahead, and flying off into the night in flock after flock; they made a roaring noise like thunder as thousands of birds took wing. They would occasionally fly a considerable distance but usually stopped, even on bright nights, after a flight of one or two hundred yards, and on dark nights they would go only a short distance.

The best time for banding work was on a very dark night, just after a rain, when the leaves underfoot were damp, allowing one to walk without making a crackling sound. Our best work was done in about three hours on such a night, when we banded thirty-nine birds. We would leave a burning lantern in the old timber road—this was necessary to keep from becoming lost—and would work on either side of the road with flashlights, spotting the bird and netting him, in this manner sometimes catching two at a time. Only one injury, a broken leg, resulted during the entire period, and this was caused by inexperience on the part of the captor, who became very adept after this accident. The bird injured was a large pale bird, belonging to Type Three, but the specimen was not preserved. The disturbance caused by a capture was great, but the birds were very capable of flight in the night, and soon were again at rest.

Both Barred and Great-horned Owls preyed continually upon the Robins, as did the bobcats, and house cats that had become feral. Red-tailed Hawks were usually to be seen sailing over as the birds came in late in the evening, but I never noticed any disturbance caused by the hawks, nor did they seem interested in the many Robins flying about.

The deep, gutteral "meow's" of the bobcats as they stalked their prey nearby and that almost terrifying snarl as they made the kill furnished a regular thrill that served to make the night work interesting. Assured by old hunters that they were perfectly harmless, I was confident that they would not attack; yet being continually followed by from one to four of these animals as they softly padded along uttering a regular purring "meow" always made me uneasy.

The most blood curdling sound of the woods was made, however, not by the cats, but by the Barred Owl, when after killing a bird he would let forth a medley of unearthly hoots, squawks, and screams that sounded as if the demons of Pandemonium were paying a personal visit to the roosting grounds.

On several occasions both species of owls as well as the cats would make kills so near that the dying sounds made by the Robins could be heard distinctly, the cats being particularly unmindful of our presence in this respect, one cat killing three birds within twenty-five feet of a party of four one night within a very few minutes. The toll these raptores and cats collected from the flock was enormous.

A résumé of the study produces these evident facts:

First, that the birds of the entire country—as shown by plumage variation—flock and feed together during the winter season, but segregate into small bunches, probably family groups and units of such, of their own race, at night.

Second, that in feeding they cover a radius of at least twelve miles. Thus the birds of a single roost range and feed over a territory of somewhat more than 452 square miles, at the least estimate.

Third, that their migration during the winter is decidedly irregular and determined solely, or nearly so, by the presence of desirable food.

And Fourth, that in banding together to protect themselves from their enemies they defeat their own purpose, as do most other birds with this habit, and, instead, open themselves to the united attack of every possible enemy for miles around.

Winslow, Arkansas.

CURVATURE OF WING AND SOARING FLIGHT

BY WILLIAM BREWSTER TABER, JR.

In his paper, "The Soaring of Raptorial Birds",[1] Mr. Palmer has brought our attention to the fact that soaring is made possible by upward moving air currents. However, in his explanation of the phenomenon he considers the wing to be flat. I would like to point out that the concave curvature of the under surface of bird wings is an essential factor in soaring flight, and the effects derived therefrom. The principle involved is identical with the principle of the impulse steam or water turbine which has been utilized in a commercial way by mechanical engineers for a hundred years or more.

In order to understand the principle it will be necessary to resort to a diagram employing the devices which engineers use. In figure 6 the heavy curved line *CD* represents the cross section of a bird wing, *C* being the thick, front edge. The bird is travelling to the left, horizontal to the ground as shown by the direction of the arrow above it.

[1]Wilson Bulletin, March, 1931, pp. 18-24.